

WHAT IS CLAIMED IS:

1. A liquid crystal display apparatus,
comprising:

a pair of opposed boards,

a liquid crystal layer and a liquid crystal
driving unit which are held in being sandwiched between
said facing substrates, and

polarizer and phase plates which are located
on an upper side and on a lower side of said facing
substrates, respectively, wherein a pixel of said
liquid crystal display apparatus includes a reflection
display unit whose reflections applied voltage
characteristic is a normally-closed type and a
transmission display unit whose layer thickness is
thicker than that of a liquid crystal layer
constituting said reflection display unit, said
polarizer and said phase plate located on said lower
side of said facing substrates forming an elliptical
polarizer.

2. The liquid crystal display apparatus as
claimed in Claim 1, wherein, when a layer-gap between
said transmission display unit and said reflection
display unit is set to be d , an effective birefringence
of a liquid crystal material is set to be Δn , and a
wavelength of a transmission light is set to be λ , an
angle θ formed between a slow axis of said lower-side
phase plate and a transmission axis of said lower-side
polarizer falls in a range of

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$$40^{\circ} - 180^{\circ} \times \Delta n d / \lambda < \theta < 50^{\circ} - 180^{\circ} \times \Delta n d / \lambda.$$

3. The liquid crystal display apparatus as claimed in Claim 1, wherein, when a layer-gap between said transmission display unit and said reflection display unit is set to be d , an effective birefringence of a liquid crystal material is set to be Δn , and a wavelength of a transmission light is set to be λ , an angle θ formed between a slow axis of said lower-side phase plate and a transmission axis of said lower-side polarizer falls in a range of

$$43^{\circ} - 180^{\circ} \times \Delta n d / \lambda < \theta < 47^{\circ} - 180^{\circ} \times \Delta n d / \lambda.$$

4. The liquid crystal display apparatus as claimed in Claim 1, wherein said lower-side phase plate includes a first lower-side phase plate and a second lower-side phase plate, a retardation of said first lower-side phase plate falling in a range of 180 nm to 220 nm, a retardation of said second lower-side phase plate falling in a range of 200 nm to 400 nm.

5. The liquid crystal display apparatus as claimed in Claim 1, wherein said lower-side phase plate includes a first lower-side phase plate and a second lower-side phase plate, a retardation of said second lower-side phase plate being larger than that of said first lower-side phase plate, and a difference therebetween falling in a range of 180 nm to 220 nm, said retardation of said first lower-side phase plate falling in a range of 50 nm to 180 nm.

6. The liquid crystal display apparatus as

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claimed in Claim 1, wherein said lower-side phase plate includes a first lower-side phase plate and a second lower-side phase plate, a retardation of said first lower-side phase plate falling in a range of 50 nm to 180 nm, a retardation of said second lower-side phase plate falling in a range of 100 nm to 200 nm.

7. The liquid crystal display apparatus as claimed in Claim 1, wherein a twist angle of said liquid crystal layer falls in a range of 40° to 70° , a retardation of said liquid crystal layer falling in a range of 200 nm to 350 nm, a retardation of said upper-side phase plate falling in a range of 280 nm to 470 nm, a retarded-phase axis azimuth-angle of said upper-side phase plate falling in a range of 30° to 75° , an absorption axis azimuth-angle of said upper-side polarization plate falling in a range of 30° to 90° .

8. The liquid crystal display apparatus as claimed in Claim 1, wherein a twist angle of said liquid crystal layer falls in a range of 75° to 85° , a retardation of said liquid crystal layer falling in a range of 200 nm to 310 nm, a retardation of said phase plates falling in a range of 320 nm to 460 nm, a slow axis azimuthal angle of said phase plates falling in a range of 105° to 145° , an absorption axis azimuthal angle of said polarization plates falling in a range of 25° to 65° .

9. The liquid crystal display apparatus as claimed in Claim 1, wherein a twist angle of said

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liquid crystal layer falls in a range of 50° to 100° , said upper-side phase plate including a first upper-side phase plate and a second upper-side phase plate, a retardation of said second upper-side phase plate falling in a range of 50 nm to 280 nm, a retardation of said first upper-side phase plate being larger than that of said second upper-side phase plate, and a difference therebetween falling in a range of 70 nm to 190 nm.

10. The liquid crystal display apparatus as claimed in Claim 1, wherein a twist angle of said liquid crystal layer falls in a range of 50° to 100° , said upper-side phase plate including a first upper-side phase plate and a second upper-side phase plate, a retardation of said second upper-side phase plate falling in a range of 350 nm to 480 nm, a retardation of said second upper-side phase plate being larger than that of said first upper-side phase plate, and a difference therebetween falling in a range of 10 nm to 50 nm.

11. The liquid crystal display apparatus as claimed in Claim 1, wherein a twist angle of said liquid crystal layer falls in a range of 50° to 100° , said upper-side phase plate including a first upper-side phase plate and a second upper-side phase plate, a retardation of said second upper-side phase plate falling in a range of 380 nm to 480 nm, a retardation of said first upper-side phase plate being larger than

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that of said second upper-side phase plate, and a difference therebetween falling in a range of 80 nm to 120 nm.

12. The liquid crystal display apparatus as claimed in Claim 4, wherein, when an angle formed between a slow axis of said second lower-side phase plate and a transmission axis of said lower-side polarizer is set to be ϕ , an angle formed between a slow axis of said first lower-side phase plate and said transmission axis of said lower-side polarizer falls in a range of $2\phi + 35^\circ$ to $2\phi + 55^\circ$.

13. The liquid crystal display apparatus as claimed in Claim 5, wherein, when an angle formed between a slow axis of said second lower-side phase plate and a transmission axis of said lower-side polarizer is set to be ϕ , an angle formed between a slow axis of said first lower-side phase plate and said transmission axis of said lower-side polarizer falls in a range of $2\phi + 35^\circ$ to $2\phi + 55^\circ$.

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